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Measures To Promote Engineering Research Level in China

93FE0930A Beijing ZHONGGUO KEJI LUNTAN
[FORUM ON SCIENCE AND TECHNOLOGY
IN CHINA] in Chinese No 4, Jul 93 pp 4-6

[Article by Deng Nan, vice minister of State Science and Technology Commission]

[Text] To further implement the strategic thinking that science and technology (S&T) are a primary productive force, the State Science and Technology Commission decided in June 1991 to establish national engineering technology research centers and include this project under the "National S&T Development 10-Year Program and the Eighth 5-Year Plan." In the last 2 years, 39 engineering research centers, set up under the auspices of the State Council and with the support of the concerned departments and the localities, have achieved preliminary progress. In order that readers can better understand these engineering research centers, I elaborate on the significance of establishing the national engineering research centers, the progress achieved, and the plans for the future.

I. Aims and Significance of Establishing National Engineering Research Centers

1. Establishing these centers meets the needs of China's national economic development.

At present, S&T plays an important role in international competition from the perspective of overall national strength and economic power; namely, S&T has literally become a primary productive force. A country must depend on S&T if it is to survive economic competition. Protection of intellectual property rights, for example, has emerged as a paramount issue in economic and trade activities. The United States, Europe, and Japan put first priority on discussing intellectual property rights in trade negotiations. Thus, the high status of intellectual properties and S&T in economic and trade activities is apparent. In the past, imperialists and capitalists exploited the Third World countries, mainly through exploiting cheap resources and labor, but this situation has changed to a certain degree. The contemporary capitalist countries profiteer through drafting unfair trade treaties with the Third World countries and the less developed countries based on the intellectual property rights and the technologies these capitalist countries have mastered. Thus, a country will inevitably subject itself to exploitation and deprivation if it does not have its own technologies and high-tech products. Only insofar as China has its own technologies and high-tech products can it really become competitive and acquire higher profitability. China's "reform" and "open" policies have compelled us to struggle for survival in the midst of fierce international competition, thus demanding that we possess high-tech products and rely on S&T. Therefore, to strengthen

national power and to turn China into an economically strong country, it becomes imperative that we make progress in S&T, especially those technologies that can contribute directly to the economy.

2. Establishing these centers meets the needs of China's industrial structure reforms.

As generally known, China's industrial structure is highly irrational, based primarily on the economy of consumer goods and made up basically by the labor-intensive, low-skilled, and inefficient traditional industries. Such an industrial structure can neither meet the needs of national development, nor survive international competition. When we participate in international competition, such a structure will inevitably place us in a disadvantaged position. Thus, our industrial structure needs a large-scale adjustment. On the one hand, we should promote new high-tech industries; on the other hand, we should strengthen fundamental industries. Meanwhile, we should use new technologies to transform traditional industries, thus elevating the value-added effect of the traditional industries.

3. Establishing these centers meets the needs of China's key fields and the needs for vocational technology advancement.

In the development of China's vocational S&T, the weakest link lies in the low-technology level; this is one of the most important reasons for us to establish these centers. To establish national engineering research centers is to promote vocational and technological advancement.

4. Establishing these national engineering centers meets the needs of China's S&T development.

Science and technology are mutually affected and motivated. Without the development of technology, science will not receive new enlightenment and new ideas that are necessary for further scientific development and vice versa. Speaking of scientific laws, science and technology always come together. In the case of China, technology is relatively weak. Technology includes fundamental technology as well as technological research and development, especially the capacity to develop complementary technologies and to achieve a high level of industrialization. The self-development of S&T also requires strengthening this aspect and revamping the weak links, thus placing the development of S&T in a healthy cycle.

5. Establishing these national engineering centers meets the needs of China's S&T structural reform.

It is generally perceived that China's S&T structural reform has achieved great progress. We have done an enormous amount of work in combining S&T with the economy and pushing our S&T research institutes and staff to the front line, acquiring tremendous achievements. Our embryonic engineering research

centers are considered technological pioneers as well as advanced units. However, it needs to be pointed out that our national S&T structure, as a whole, features a model in which the economy is detached from S&T, a typical model of the former Soviet Union. This is exemplified in the more than 5,000 independent research institutes nationwide, the majority of which are separated from industries. It is generally acknowledged that China is a poor country and is still in an economic predicament, but we are supporting a few thousand research institutes, a fact overlooked by the developed countries. In fact, China does not have the economic capacity to support so many institutes. At present, our research institutes have tremendous difficulties in making ends meet. This situation needs to be changed completely. To change does not mean to weaken the S&T strength, but to let the state support a smaller fraction of the costs. The remaining costs would be borne by the institutes themselves, relying on the markets for survival. The proposed structural reform would break down these research institutes for reorganization, control at one end, and leave the majority free. Whether to control or to let free, it is to the end of greatly enhancing the research capacity. Additionally, it does not necessarily mean that those needing to be controlled are to be strengthened while those to be let free need not be strengthened. It actually means strengthening from different angles using different approaches. Among those to be let free in particular, a rather large portion is China's S&T main force. This force should not be wasted, but should be empowered in the market competition, should receive further nurturing from private enterprises and the markets, thus enhancing its vitality. Our country has adopted a series of measures to protect this precious research force and push it to the markets. But pushing it to the markets does not mean that we should let it go. On the contrary, we should provide it with nurturing and support, strengthen its competitiveness, and establish an operational system suitable for the socialist market economy, further enabling it to grow. Our country should utilize this force to serve its S&T development as well as economic reconstruction. At the beginning of establishing these national engineering centers, our overall goal is to select a group of research institutes that have the highest development potential. We should let them strengthen and grow by themselves in the midst of industries and markets without state support.

The aforementioned five aspects require that we enhance our engineering level and obtain achievements within a short period of time. That was our primary objective in establishing these research centers. Generally speaking, it is to enhance the level of maturity, the degree of completeness, and the level of engineering of our S&T research achievements, as well as to strengthen research on key technologies, their compatibility, and fundamental technologies in

vocational fields, expediting the process of integrating research, development, and industrialization.

II. Functions and Obligations of National Engineering Research Centers

1. The national engineering centers have first-rate S&T research ability capable of undertaking national key research projects. Therefore, they are a powerful national team.
2. The national engineering centers possess strong engineering technology development and testing abilities capable of quickly transforming scientific research results into end-user products and forming related industries. They will contribute to China's industrial structure transformation—erecting new industries and renovating the traditional industries.
3. The national engineering centers are capable of developing into a magnet for vocational technologies, a source for development, and a source for promulgating vocational technology achievements and supporting vocational sustainable development. Hence, they take the lead in pushing the advancement of vocational technologies.
4. The national engineering centers have an operating system in harmony with the laws of S&T as well as the laws of the market economy. They can constantly produce high-quality and talented people and achieve high profitability, hence turning into self-perfecting, self-developing, vibrant, and dynamic high-tech operating organs capable of assuming sole responsibility for their profits or losses.

III. Preliminary Success of Establishing National Research Centers in the Past 2 Years

Generally speaking, funding for national engineering centers has been allotted timely, fundamental infrastructure has been gradually improved, equipment is being perfected, staff persons have arrived at their individual posts, and the operating system has seen progress. With respect to social welfare and economic benefit, the multiple advantages of the national engineering centers are apparent: By the end of 1992, the first group of national engineering centers had developed and commercialized 121 research products; 118 have gone into production, of which many have reached or exceeded international standards in terms of technology and quality, yielding striking economic efficiency. According to the rough estimates of seven national engineering centers, total contract value has reached 202.31 million yuan, and replacement of profits by taxes has reached nearly 10 million. These centers have started to form into a source for the development and spread of vocational technologies, further propelling the development of vocational technologies. Some national engineering centers have targeted individual centers' key issues on technology, fundamental research, and compatibility, strengthened the work of utilizing research achievements and testing, and multiplied the functionalities during the

starting period. They have performed well as the source for developing and spreading technologies, human resource training, and international cooperation and exchange, as well as information consulting, gradually becoming an important support for vocational technology advancement. The work of establishing national engineering centers has exerted great influence nationwide. It has received support from S&T circles and acquired blessing from every state department, province, and municipality. Many provinces and municipalities have borrowed the idea of establishing national engineering centers and have set up their regional centers in timely fashion.

IV. Future Agenda

1. We should steadfastly push forward the work of establishing national engineering centers. We should plan rationally according to S&T macro planning, the objective demands of economic development, and individual conditions. We should carefully set up the 39 ratified national engineering centers, striving to achieve a complete success. We should make necessary modifications to those unsuitable national engineering centers through in-depth examination and analysis.
2. We should increase funding and ensure timely distribution. S&T requires inputs. The national engineering centers target high technology, so it would be impossible to establish these centers without inputs. The State Science and Technology Commission will vigorously provide the work of establishing national engineering centers with better terms in financing and bank loans. In the meantime, the administering departments and the entrusted units should guarantee timely distribution of the funds.
3. We should pay close attention to reform. The national engineering centers are products of reform. Thus, we should carry out reform carefully if we are to materialize the real goal of establishing the national engineering centers. The State Science and Technology Commission will further study the case and advance relevant policies. These policies would include: first, to strengthen the policy-making processes of financing (including circulating capital), staff remuneration, and taxation; second, to strengthen the systemic management of the national engineering centers and establish truly functional accounting and staffing rules.
4. We should fully understand the relationship between the national engineering centers and the units which they affiliate with. The affiliated units should bear the responsibility to set up the national engineering centers until they pass acceptance check. Meanwhile, the national engineering centers have the obligation to supply technologies and generate profitability. The national engineering centers should abide by laws from the beginning and clarify bilateral relationships in terms of responsibility, right, and profit-sharing, especially the assignment of property rights, on a mutually beneficial basis. We can select some units for trial this year, constantly reviewing and perfecting the work.
5. We should promote full-scale conversion of the national engineering centers for market entries. The national engineering centers can adopt many methods to enter the markets: They can join industrial conglomerates or form into high-tech industrial groups themselves. They can also become S&T bodies which can continually supply engineering technologies and complementary technologies. In sum, we should quickly realize the commercialization of research achievements, and thus formulate corresponding industries to the largest scale possible.
6. We should further open up and through extensive international cooperation and exchange, propel the internationalization process of our national engineering centers, thereby enabling their technologies and products to gain footing in the highly competitive international markets.
7. We should strictly inspect products, ensuring high quality. Based on the initial plan, next year will be the year for complete examination of the national engineering centers. The work of examination will follow strict procedures, coming from all aspects including technology level, completeness of technology, technology development capacity, profitability, and management. Those qualified would be officially given the title of national engineering center, carrying the standardized board. Those disqualified would be required to improve within a given time frame; otherwise, they would be eliminated. The title of national engineering center is not given permanently. Once a national engineering center passes acceptance check, it will be subject to periodic examinations. The national engineering centers should be given some pressure so that they can perpetually grow in an environment of competition.

Head of CAIC Outlines Industry's Mission

93FE0977A Beijing HANGKONG ZHISHI
[AEROSPACE KNOWLEDGE] in Chinese
No 8, 6 Aug 93 pp 8-9

[Article by Zhu Yuli [2612 5148 3810], general manager of CAIC: "Situation and Mission of China's Aerospace Industry"]

[Text] In accordance with the State Council Reorganization Plan approved by the First Meeting of the Eighth People's Congress, and the decision of the State Council to abolish the Ministry of Aerospace Industry and to form the China Aerospace Industry Corporation (CAIC), after 3 months of intense preparation, CAIC is officially established as of today.

The founding of CAIC is an important part of the reorganization of the administrative management system in the government. It is a critical item in the reform of specialty economic departments in the State Council. This change is fundamentally different from previous organizational changes in the aerospace industry. It is a major change of the operating system to meet the need of growth in a socialist market economy as stressed in Deng Xiaoping's speech during his tour of the south and as a part of the spirit of the 14th Plenum of the Chinese Communist Party. It will have a profound impact on the vitalization of the aerospace industry. It will stimulate changes in management style and fundamentally disengage government from business. This will further organize the aerospace industry to take advantage of collective superiority. This will force the aerospace industry to face its market and come up with a new approach to fast growth under a socialist market economy. This will push the conversion of the operating mode of different businesses to put the aerospace industry in a better position.

The preparation of CAIC was done under the direct guidance of the Party Central, the State Council, and the Central Military Commission, as well as under the direct order and support of central organizing committees and various relevant departments. On the basis of the requirement imposed by the Party Central and the State Council to adapt to a socialist market economy, in accordance with the reorganization principle of having an independent, lean, effective, efficient, and rational organization, after referring to the management systems in major foreign aerospace corporations, and taking China's unique situation into consideration, we decided that CAIC must insist on "eight beneficial principles." It must benefit the development of the aerospace industry under a socialist market economy and implement the policy to "consolidate military and commercial applications, combine [civilian] and [military] products, give priority to the military and use commercial products to support the military." We must insist that it is beneficial to put "quality first." It must benefit the implementation of a policy that "science and technology is the number-one productive force." It must benefit the gradual shift

of our focus to areas that depend upon technical advances and improvement of worker quality. It must benefit us to inherit and continue the tradition and honor of the aerospace industry to handle "two civilizations" at the same time. It must benefit the continuity of work and business. It must benefit the implementation of the "regulations concerning the conversion of management system of people-owned businesses." It must benefit the stability and unity of the team.

Based on these principles and the strategic mission of vitalizing the aerospace industry, we studied the major functional changes of the corporation. First, we have to make a transition from a government organization to a business entity as soon as possible. In accordance with the principle of separating government from business and the "regulations concerning the conversion of management system of people-owned businesses," the corporation is transferring all regulating functions to various departments in the State Council, delegating the business running authority and service oriented functions to operating units. The corporation should focus on planning, coordination, management, service, and monitoring to make it an independent economic entity that manages the nationally owned aerospace industry, combines military and commercial applications, integrates technology with trade (finance), and is responsible for its own profitability and growth. Next, the corporation needs to pursue the transition from a material operating mode to a capital operating mode to gradually convert the corporation to an investment and decision-making center. Subsidiaries and groups will become profit centers through selling goods. It will require some restructuring to create this new mode of operation. Specifically, the corporation and its subsidiaries will have two different management systems.

The founding of CAIC is a new beginning for the vitalization of China's aerospace industry. In the past four decades, under the correct leadership of the Party Central, the State Council and the Central Military Commission and with the kind concern of the older generation of revolutionaries and the support of the people, after generations of hard work, the aerospace industry has rapidly developed to a respectable scale. A relatively comprehensive technology system has been established to contribute to the national economy. Nevertheless, to meet the needs in the Four Modernizations and compared to worldwide advanced level, we are still lagging behind. Presently, there is a good opportunity for fast reform and rapid growth in the aerospace industry. The Party Central, the State Council and the Central Military Commission are very concerned about the development of the aerospace industry. The profound change of our economic system and the rapid expansion of our economy provide more room for the aerospace industry to grow. The international aerospace community has a strong desire to cooperate with us. In particular, our huge market, both military and commercial, urgently requires us to supply high quality and better performance products. In the meantime, we are also

facing severe challenges. The aerospace products developed cannot meet military and commercial needs. Especially, the commercial "short haul" aircraft is a problem. The entire industry is not profitable. Competition of domestic commercial aerospace products is fierce. After China re-enters the GATT, it will also be severely impacted by international competition. This new challenge and opportunity are pressure as well as driving force for us. We must thoroughly understand and implement General Secretary Jiang Zeming's instruction to grasp, treasure, and utilize this opportunity. We must realize that we are in a crisis and there is an urgency to complete this mission. We have to turn the pressure upon us into a driving force. We need to further liberate our thoughts, be more practical, work on the real problem, and meet the challenge in order to create a new horizon for the aerospace industry.

On the basis of the present situation facing the aerospace industry, in accordance with the demand of the 14th Plenum of the Chinese Communist Party to establish a socialist market economy, based on our successful experience in the past, the ideological guidelines for the aerospace industry in this new era are to liberate our thinking, be practical, switch the operating system, optimize the organization, rely on science and technology, stress quality, expand the open market, improve profitability, seize the opportunity, and vitalize the aerospace industry. The development directions include combining military and commercial business, using aeronautics as the base, managing a variety of businesses, creating a wide range of markets, and marching toward a worldwide market. The spirit of the industry is independence, hard work, cooperation and contribution without reservation. Our development scheme is to implement the "Tengfei [Soaring] Plan" by the end of this century by mobilizing all the resources in the industry in a two-step process. In the first 3 years (1993-1995), a new aerospace industry is to be established. Specifically, the objectives are to reach four new plateaus: a new technology plateau for aerospace products, a new technology plateau for non-aerospace products, a new plateau for export, and a new plateau for profitability industrywide. Major economic indicators will jump significantly. The annual industrial product will increase at a 20-percent rate. Revenue in 1995 will double that of 1992. We will have \$800 million of export business and generate 1.4 billion yuan of pre-tax profit. In the next 5 years, we will grow even faster on this foundation. In the field of aeronautics, breakthroughs in a number of technologies will be made. A few series of commercial aircraft will be developed based on some appropriate aerospace weapons systems. Exports will reach one-third of the total product value. There will be substantial growth in the third industry to become part of the three-legged stool together with aerospace products and commercial products. In addition, we plan to create a number of outstanding companies that have influence worldwide. By doing so, we will have laid down a solid foundation for the strategic mission of vitalizing the aerospace

industry in the next 10 to 15 years. To this end, we must focus our efforts on the following seven tasks.

1. Liberate our thinking to make fundamental conceptual changes.

In the past, the aerospace industry in China was under the control of a highly centralized planned economic system. Our thinking, concept, habit, system and approach are extremely incompatible with the needs of a socialist market economy. A fundamental change is required. Therefore, we must be determined to study Deng Xiaoping's theory of constructing a socialist society with Chinese characteristics, grasp the basic knowledge and fundamental rules of a socialist market economy as soon as possible, place tasks such as the operating strategy, technical development, system conversion, structural reorganization and improvement of profitability on the basis of an appropriate market economy, and work hard to explore a new way to develop the aerospace industry under this socialist market economy.

2. Combine development with reform to enhance the effect of functional and system changes.

The root of the problem in the aerospace industry is the system and the key is the way we do business. In order to resolve fundamentally this dilemma, we must intensify the effect of the reform as we accelerate the pace of development. The corporation must adhere to the principles of "focusing on aerospace, opening commercial products" and "macroscopic management and microscopic flexibility" and take charge of major tasks such as strategic development, capital management, major model control and scientific research and training in order to fully exercise the 14 operating authorities in fact. Basic level companies and operating groups must also speed up the conversion program and strengthen their management. In particular, quality management and various basic management work must be stressed to continuously enhance vitality to keep the aerospace industry on a steady and coordinated growth track. By way of functional and system changes, a two-stage management system will be created in the aerospace industry.

3. Adjust industry structure, product structure, and organizational structure to take advantage of collective superiority.

The founding of CAIC created the first step needed for structural adjustment. We must grab this opportunity to create a rational organization so that we can concentrate all our forces to enhance our competitiveness in worldwide markets by taking advantage of our collective superiority. By way of adjustment, developing the two wings (commercial products and the third industry) and strengthening the main business

(aerospace products), we can create a diversified and versatile industry that is driven by technology, based on aerospace, doing military and commercial business, involved in export and import and active in both second and third industry. In addition, in a collaborative manner, we need to actively support local small aircraft manufacturing industries and to mobilize the entire society to accelerate the development of civil aviation.

4. Adhere to the policy that science and technology is the number-one productive force and vitalize aerospace high technology.

As a high-tech industry, the aerospace industry must vitalize science and technology in order to push the entire industry to a new height. Priority must be given to science and technology. Preliminary research must be strengthened. We have to track high-tech development in aerospace worldwide and stress on education and training. Development of aerospace products will be supported by high technology. We plan to build a number of high-level aerospace research institutes, product design institutes, national laboratories, and top aerospace higher learning institutions in order to allow China's aerospace industry to gain some recognition worldwide.

5. Expand the scope of the open policy and speed up access to international market.

Creating an overseas market is imperative for the aerospace industry. We have to promote international cooperation, actively pursue appropriate advanced technology and make more companies aware of the worldwide market in order to realize the overall development plan involving international trade, foreign investment and foreign management. This will make CAIC an organization to be reckoned with in the worldwide aerospace industry.

6. Raise capital by various means to strengthen development effort.

A variety of flexible and attractive development mechanisms, such as joint ventures, cooperation, stock subscriptions, and loans, may be used to raise funds necessary to reform the industry and stimulate growth.

7. Strengthen the construction of socialist civilization and establish the correct political ideology.

Let us honor our inherited tradition and strengthen the construction of socialist civilization and establish the correct political ideology. In particular, the leaders must be united as a group and must be honest and clean in order to establish a new atmosphere of unity and harmony throughout the industry.

Leaders, ladies, gentlemen, friends and comrades, the founding of CAIC signifies a new era for the aerospace industry. We must further implement the spirit of the 14th Plenum of the People's Congress. Guided by Deng Xiaoping's theory of constructing a uniquely Chinese socialist society, we will insist on sticking to the basic approach of the party, work hard to complete the mission assigned to us by the Party Central, the State Council, and the Central Military Commission to build and maintain a strong aerospace industry. During the development stage in the past, we received excellent support from various superior organizations, friendly industries and departments, General Commands of the People's Liberation Army, different branches of the armed forces, and various local governments. We also received the enthusiastic assistance from a large number of friends in the international aerospace community. I would like to represent all employees of the entire aerospace industry to express our sincere gratitude. Furthermore, we wish to continue receiving your support and assistance in the future to jointly speed up the pace of progress.

Pyro-Optical Phosphorescent Material, Dosimeter Are State-of-the-Art

94P60029A Beijing ZHONGGUO KEXUE BAO
[CHINESE SCIENCE NEWS] in Chinese
17 Sep 93 p 2

[Article by Liu Jian [0491 0494]: "Xinjiang Institute of Physics Develops Pyro-Optical Phosphorescent Materials"]

[Summary] Urumqi (ZHONGGUO KEXUE BAO wire report)—A CAS Xinjiang Institute of Physics group led by Research Fellow Ba Weizhen [1572 4850 4176] has developed a $\text{CaF}_2\text{:Mn}$ pyro-optical phosphorescent powder material and $\text{CaF}_2\text{:Mn}$ /Teflon pyro-optical dosage device [i.e., dosimeter] whose principal performance indicators are at the international state-of-the-art. In particular, the dosimeter's dose rate response, degrading characteristics, and repetitive-use lifetime meet or exceed the corresponding indicators for the comparable U.S.-made device. This material and the dosimeter constructed from it are critical to domestic radiation-hardened semiconductor development and have previously been imported.

Chinese Scientists Discover Tubular Carbon-Hydrogen Clusters

94P60029B Beijing ZHONGGUO KEXUE BAO
[CHINESE SCIENCE NEWS] in Chinese
20 Sep 93 p 1

[Article by Zhang Yaguang [1728 0068 0342]: "Nation's Scientists Are First To Discover Tubular Carbon-Hydrogen Clusters"]

[Summary] It has been learned from scientists at the Key State Laboratory for Molecular Reaction Dynamics that in the course of their research on molecular clusters they have discovered tubular carbon-hydrogen clusters—the first report of such a discovery anywhere in the world. Internationally renowned scholar Smalley, the discoverer of C_{60} , has called this an "intoxicating" finding. These new structures, each of which consists of over 100 carbon atoms forming a cylinder with the hydrogen atoms at one or both ends, have varying diameters depending on which aromatic compound is used to produce them.

Activated-Charcoal-Filter Composite in Production

94P60029C Beijing ZHONGGUO DIANZI BAO
[CHINA ELECTRONICS NEWS] in Chinese
18 Oct 93 p 1

[Article by Liu Aoxing [0491 2407 5281]: "Activated-Charcoal Filter Network Composite Material in Production"]

[Summary] The KJC air-purifier activated-charcoal filter network composite material developed by the Jiangsu Wujin Institute of Purification Technology and manufactured by the Wujin Xuejia Special Fabrics and Materials Plant just passed its formal technical appraisal, at which the experts pronounced it a technical breakthrough for the nation's air purification industry. The new material, whose performance indicators exceed those for the comparable foreign-made product by three to five times, is designed to filter and adsorb 0.3-micron particles in a variety of aerosols and harmful gases. At present, the Wujin Xuejia Plant can annually manufacture 100,000 square meters of this composite.

The Establishment of Hybridoma Cell Strains Producing McAb Against Vi Antigen of *S. typhi* and Study on the Protective Effect

40091001A Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 238-241

[English abstract of article by Wang Kaijuan [3769 0418 1227] and Zhang Shubo [1728 2885 3134] of the Institute of Epidemiology and Microbiology, Chinese Academy of Preventive Medicine, Beijing]

[Text] The protective effect of the Vi capsular polysaccharide of *Salmonella typhi* was studied with 9 strains of McAb. The ELISA titers of the McAbs were from 1:800 to 1:6400. Agglutination titer against strain containing Vi antigen was 1:400 to 1:1600.

The passive protective effect of these McAbs was studied with the mouse model challenged intraperitoneally with *S. typhi* Ty2 suspended in 5 percent mucin. They could confer protection from 60 percent to 100 percent when the mice were challenged with 100 LD₅₀ of *S. typhi* Ty2. The 50 percent protection dose (PD₅₀) of two McAb was measured. The results showed that the McAbs contained 170 and 195 PD₅₀ units per ml respectively when challenged with 100 LD₅₀ doses, the serum against whole cell of *S. typhi* Ty2 was 220 PD₅₀ units.

The McAbs could enhance the effect of phagocytes on engulfing and demaging bacteria, but they had not anti-colonization and bactericidal effect when complement was present.

Chemical Analysis of 67 kD Protein Antigen of *Coxiella burnetii*

40091001B Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 249-251

[English abstract of article by Zhi Ning, et al. of the Department of Microbiology, The Third Military Medical University, Chongqing]

[Text] The outer membrane proteins (OPM) of *Coxiella burnetii* (CBQYIC₃) were purified with McAb affinity chromatography. A 67 kD OPM antigen was identified by SDS-PAGE and protein immunoblotting. In order to verify the possibility of this OPM antigen able to be used as a vaccine, the chemical composition of the 67 kD OPM antigen was analyzed in this study. The results showed that the 67 kD OPM antigen contained 17 kinds of amino acid and 0.06 percent sugar, but no 2-keto-3-deoxyctulosonic and heptoses found.

Identification of *Rickettsia prowazeki* and *Rickettsia mooseri* by Using the Polymerase Chain Reaction

40091001C Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 252-254

[English abstract of article by Chen Jun [7115 6874], Zhang Yuanfu [1728 6678 1381], et al. of the Institute of Epidemiology and Microbiology, Chinese Academy of Preventive Medicine, Beijing]

[Text] Polymerase chain reaction (PCR) amplification of DNA was used to detect and type the agents of typhus. A primer pair derived from the 17 kD antigen sequence of typhus group rickettsiae was used to amplify a 340 base-pair (bp) fragment of the genome of *Rickettsia prowazeki* and *Rickettsia mooseri* under strictly annealing temperature. The spotted fever group rickettsiae used in the experiment was not amplified. With another primer pair derived from the 160 kD antigen sequence of *R. p.* a 432 bp fragment was amplified only from the genome of *R. p.* When the two primer pairs were used in a reaction system, in the meantime the genome of *R. p.* produced two amplified fragments (340 bp and 432 bp), but *R. m.* produced only one (340 bp). As few as 0.05 ng DNA of rickettsiae can be detected and typed successfully by this technique.

Genotypic Identification of Spotted Fever Group *Rickettsiae* Isolated in China

40091001D Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 255-257

[English abstract of article by Li Shaojuan [2621 1421 1227], Fan Mingyuan [5400 2494 6678], et al. of the Institute of Epidemiology and Microbiology, Chinese Academy of Preventive Medicine, Beijing]

[Text] BJ-90 strain and BJ-91 strain of spotted fever group rickettsiae were isolated from Dermacentor sinicus in Changping county of Beijing. Ha-91 strain isolated from Hyalomma asiaticum (Kozlovi Olenov) in A'meng district of Inner Mongolia. The rickettsiae were identified by analysis of endonuclease restriction of chromosome DNA, and polymerase chain reaction followed by restriction endonuclease fragment length polymorphism (PCR/RFLP) of the 190 kD antigen gene. Results showed that the BJ-90 strain and BJ-91 strain and Ha-91 strain belong to *Rickettsia sibirica*.

Effect of Insertion of Interleukin 2 Gene on the Expression and Immunogenicity of Hepatitis A Virus Antigen Derived From Recombinant Vaccinia Virus

40091001E Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 258-260

[English abstract of article by Guo Kejian [6753 0668 6190], Yi Yao [0122 3852], et al. of the Institute of Virology, Chinese Academy of Preventive Medicine, Beijing]

[Text] A potential risk of using vaccinia virus as a vector for genetic engineered vaccines is its rare but severe complication—disseminated vaccinia infection, which happened in immunodeficient vaccines. There have been evidences that interleukin 2 (IL-2) protects athymus nude mice from deadly vaccinia infection. To determine the effect of the insertion of IL-2 on a hepatitis A/vaccinia recombinant (VMS11HAV25), a recombinant (VMS11HAV25-IL-2/Lac) was constructed by inserting IL-2 gene into the thymidine kinase region of VMS11HAV25. Results showed that the new recombinant expressed both hepatitis A virus antigen and IL-2, and the titer of hepatitis A virus antigen was similar to that expressed by VMS11HAV25. The virulence of the recombinant containing IL-2 gene appeared lower than that without IL-2 gene when tested intradermally in rabbits. The antibody response against hepatitis A virus elicited by VMS11HAV25-IL-2/Lac seemed to be similar, if not slightly higher, to that induced by VMS11HAV25.

Binding Dynamics of the Recombinant Hepatitis B Virus PreS1 Peptide to the Human Liver Plasma Membranes

40091001F Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 13 No 4, Aug 93 pp 261-164

[English abstract of article by Liu Yanxin, et al. of the National Laboratory of Medical Molecular Biology, Institute of Basic Medical Science, Chinese Academy of Medical Sciences, Beijing]

[Text] The strong hepatotrophism of the hepatitis B virus (HBV) could be resulted from the presence of a specific receptor of HBV surface antigen (HBsAg) on human liver plasma membranes. However, there is not any direct evidence reported. In a previous paper we described that an expression vector containing the coding region of the HBV surface antigen PreS1 peptide was constructed and the recombinant PreS1 (r-PreS1) was able to bind specifically to the isolated human liver plasma membranes. In the present paper the binding dynamics of the r-PreS1 to human liver cell plasma membranes is reported. Scatchard analysis showed that there were high and low affinity binding sites of r-PreS1

existed on the human liver membranes and the KD values were 11 nmol/L and 5.6 μ mol/L respectively. [sentence as published] Moreover, the binding of r-PreS1 to the hepatocyte membranes was time-temperature-dependent and could be inhibited by PreS1-specific antibody. This study clearly showed the presence of a receptor for the PreS1 on the plasma membranes of human liver cells.

Amplification, Cloning and Sequence Analysis of a SSUrRNA Gene Fragment of *Plasmodium vivax* Isolates From Yunnan Province

40091001G Shanghai ZHONGGUO JISHENGCHONGXUE YU JISHENGCHONGBING ZAZHI [CHINESE JOURNAL OF PARASITOLOGY & PARASITIC DISEASES] in Chinese Vol 11 No 2, May 93 pp 81-85

[English abstract of article by Wan Lei [8001 4320], Chen Peixia [7115 1014 7209], et al. of the Department of Parasitology, Fourth Military Medical University, Xian, Shaanxi; the project was supported by the National Natural Science Foundation of China]

[Text] According to known SSUrDNA sequences of *Plasmodium vivax*, correlated protozoa and human being, sequences of oligonucleotide primers were defined with computer programming. Specific SSUrDNA fragment of *P. vivax*, about 640 bp in length, was directly amplified by two temperature point polymerase chain reaction from extracted genomic DNA of two blood samples of vivax malaria patients from Yunnan Province. Using dideoxynucleotide terminator method, the sequences of amplified DNA fragments were determined separately and showed no difference between the two samples. However, comparison of the sequence reported by Waters AP and McCutchan TF (1989) and that of amplified fragment of Yunnan *P. vivax* isolates revealed the existence of nucleotide substitution and deletion which occurred respectively in the sites 269 and 630, and resulted in the change of restriction map.

Ultrastructural Localization of 145/102 kDa Antigens in Erythrocytic Stages of *Plasmodium falciparum*

40091001H Shanghai ZHONGGUO JISHENGCHONGXUE YU JISHENGCHONGBING ZAZHI [CHINESE JOURNAL OF PARASITOLOGY & PARASITIC DISEASES] in Chinese Vol 11 No 2, May 93 pp 102-104

[English abstract of article by Liu Erxiang [0491 1422 5046], Li Wenlu [2621 2429 8692], Miao Weimin [4924 3634 3046], et al. of the Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences, Beijing and Department of Parasitology, Second Military Medical University, Shanghai; this investigation (880153) received financial support from the UNDP/World Bank/WHO Special Program for Research and Training in Tropical Diseases]

[Text] The ultrastructural localization of the 145/102 kDa antigens recognized by the possible protective monoclonal antibody (McAb) M26-32 in erythrocytic stages of *Plasmodium falciparum*, FCC1/HN, in vitro, was investigated by immuno-electron microscopy with LR White resin embedding and colloidal gold probe cytochemistry techniques. The results showed that the gold particles were mainly localized within the cytoplasm of ring forms, trophozoites, schizonts and merozoites of the *Plasmodium*. Some gold particles were found to locate on the pellicular complex of the plasmodium surface or in the cytoplasm of the infected erythrocytes. The results indicated that 145/102 kDa antigens were the common cytoplasmic antigens of asexual blood stages of *Plasmodium falciparum*, FCC1/HN, while a portion of the antigens could be transported to the cytoplasm of the infected erythrocytes via the pellicular complex of the plasmodium surface.

Immunoelectron-Microscopic Localization of a 54-kDa Protein Overexpressed by Chloroquine-Resistant *Plasmodium berghei* ANKA Strain

400910011 Shanghai ZHONGGUO
JISHENGCHONGXUE YU JISHENGCHONGBING
ZAZHI [CHINESE JOURNAL OF PARASITOLOGY
& PARASITIC DISEASES] in Chinese
Vol 11 No 2, May 93 pp 105-107

[English abstract of article by Li Gaode [2621 7559 1795], Qu Fengyi [4234 6646 0122], et al. of the Department of Parasitology, Second Military Medical University, Shanghai]

[Text] A 54-kDa protein overexpressed by chloroquine-resistant *Plasmodium berghei* ANKA strain was first reported by this department. In this paper, the localization of this protein by immunoelectron microscopy is presented. The results showed that the protein was mainly scattered inside the cytoplasm of the early, late trophozoites and schizonts of erythrocytic stage of *P. berghei* ANKA strain, and some of it was also found in cytoplasm of erythrocytes infected with parasites. The protein content was much higher in chloroquine-resistant *P. berghei* ANKA strain than in chloroquine-sensitive *P. berghei* ANKA strain, suggesting the importance of this protein in understanding mechanism of chloroquine resistance in malaria parasites.

The Establishment of Genomic DNA Libraries for the Human Malaria Parasite *Plasmodium falciparum*

40091001J Shanghai ZHONGGUO
JISHENGCHONGXUE YU JISHENGCHONGBING
ZAZHI [CHINESE JOURNAL OF PARASITOLOGY
& PARASITIC DISEASES] in Chinese
Vol 11 No 2, May 93 pp 116-119

[English abstract of article by Zheng Honggang [6774 3163 0474], Wang Bin [3769 2430], et al. of the Institute of Genetics, Academia Sinica, Beijing]

[Text] The DNA of *Plasmodium falciparum* has been purified and fragmented with restriction endonuclease BamHI. the fragments have been incorporated in vitro into derivatives of bacteriophage lambda EMBL₄ digested with BamHI and Sal I. The recombinant mixture has been ligated and packaged in vitro. The recombinant phages have been identified in *E. coli* L₉₅ host cell and the libraries have been established in which most of the parasite DNA is represented. The ligation proportion of vector to insert is 3:1. The recombinant phages of 4×10^5 have been obtained. By plaque hybridization, the laboratory has been able to recover from these libraries specific clones containing repetitive DNA sequences.

Studies on the Establishment of Malarial Animal Model of Short-Term Relapse III. Combined Therapy With Pyronaridine-Artemether-Chloroquine for Parasitemia Clearance

40091001K Shanghai ZHONGGUO
JISHENGCHONGXUE YU JISHENGCHONGBING
ZAZHI [CHINESE JOURNAL OF PARASITOLOGY
& PARASITIC DISEASES] in Chinese
Vol 11 No 3, Aug 93 pp 180-184

[English abstract of article by Zhang Jiaxun [1728 1367 1053], Lin Baoying [2651 1405 5391], et al. of the Institute of Parasitic Diseases, Chinese Academy of Preventive Medicine, Shanghai]

[Text] To establish a *Plasmodium cynomolgi*-monkey model of short-term relapse, different antimalarials have been used to inhibit recrudescence so as to elude the confusion between the two different onsets. When a single dose of effective schizonticides pyronaridine, artemether or chloroquine was administered, recrudescence readily occurred.

This paper reports the results of the combined therapy with the above three drugs. Seven rhesus monkeys from Guangxi Autonomous Region infected with *Plasmodium cynomolgi* from Vietnam by blood transmission were rapidly cured by combined therapy with pyronaridine 6 mg/kg-artemether 100 mg/kg-chloroquine 10 mg/kg (PAC-1) once daily for 3 days. The average time of parasite clearance was 3.43 ± 0.89 d and the curvilinear regression equation of parasite density after treatment was $Y = 10^{3.94-0.83X}$. Severe side effects of the gastrointestinal tract occurred during the course of treatment, though no recrudescence was found after 300-400 days. To reduce the side effects, another test was carried out in 3 monkeys and the dosage regimen was modified to pyronaridine 6 mg/kg-artemether 10 mg/kg-chloroquine 20 mg/kg (PAC-2) once daily for 3 days. There was no obvious side effect in the tested monkeys and the parasites were cleared during a mean time of 2.67 ± 0.58 d and the curvilinear regression equation of parasite density was $Y = 10^{3.7-1.46X}$. No recrudescence was detected in the animals during a follow-up of 180 days.

The study shows that PAC-2 regimen of the combined therapy is effective for parasitemia clearance and might be adopted for establishment of the monkey model of short-term relapse.

Studies on Residual Antimalarial Activity of Tripyridine in Mice and Monkeys

40091001L Shanghai ZHONGGUO
JISHENGCHONGXUE YU JISHENGCHONGBING
ZAZHI [CHINESE JOURNAL OF PARASITOLOGY
& PARASITIC DISEASES] in Chinese
Vol 11 No 3, Aug 93 pp 190-194

[English abstract of article by Chen Lin [7115 2651], Dai Zurui [2071 4371 3843], et al. of the Laboratory for Antimalarial Drug Research, Second Military Medical University, Shanghai; the project was supported by the National Natural Science Foundation]

[Text] This paper reports the experiments in which tripyridine free base at a dose 4.5 times that of ED₅₀ was given to mice by intragastric administration. On the 20th day following the administration the mice were inoculated with 1×10^7 RBC infected with *Plasmodium berghei* ANKA strain. The infection rate was zero, implying that all mice had acquired protection. Although the residual activity time of tripyridine phosphate was longer than that of tripyridine free base or piperazine phosphate, but tripyridine phosphate caused vomiting in monkeys during the medication. The residual antimalarial activity of tripyridine hydroxynaphthoate was less than that of tripyridine phosphate or tripyridine free base. A total dose of 200 mg/kg of tripyridine free base ensured residual antimalarial activity against *P. cynomolgi bastianellii* for 20 days. However, the residual activity decreased evidently when the total dose was reduced to 100 mg/kg. In short, it seems that the residual antimalarial activity of tripyridine free base is slightly less than that of piperazine in monkeys.

A Study on the Monoclonal Anti-Idiotypic Antibody NP30 for the Diagnosis of Schistosomiasis Japonica

40091001M Shanghai ZHONGGUO
JISHENGCHONGXUE YU JISHENGCHONGBING
ZAZHI [CHINESE JOURNAL OF PARASITOLOGY
& PARASITIC DISEASES] in Chinese
Vol 11 No 3, Aug 93 pp 195-197

[English abstract of article by Wu Yiqin, Tao Ruhua, et al. of the Department of Parasitology, Nanjing Medical College, Nanjing]

[Text] In this study the ability of the monoclonal anti-idiotypic antibody NP30 was tested as a substitute of diagnostic antigen in detecting antibody of *Schistosoma japonicum* from human sera by use of ELISA. The results showed that the seropositive rate was 98 percent with NP30 in the group of acute infection, which was comparable to 94 percent with gut associated antigens (GAA)

and 98 percent with the soluble egg antigens (SEA); 87 percent with NP30 in the group of chronic infection which was comparable to 86 percent with GAA but lower than that of 98 percent with SEA. The false positive rate was about 3 percent for all three diagnostic antigens. The results also showed that the geometric mean titer (GMT) of antibody to NP30 was higher than that to GAA but lower than that to SEA in the acute infection group and the GMT of antibody to NP30 was lower than both those to GAA and to SEA in the chronic infection group, suggesting that the antibody to NP30 appeared earlier and decayed more quickly during the process of infection. The authors suggested that NP30 could be used for the diagnosis of schistosomiasis japonica.

Isolation of 1075 Clones Containing Human X Chromosome Specific Single Copy DNA Sequences

40091002A Beijing GAOJISHU TONGXUN [HIGH
TECHNOLOGY LETTERS] in Chinese
Vol 3 No 4, 1993 pp 3-5

[English abstract of article by Lin Yunfu [2651 0061 1381], Chai Jianhua [2693 1696 5478], and Tan Jiazhen [6151 1367 2823] of the Institute of Genetics, Fudan University, Shanghai]

[Text] Human X chromosome specific lambda Charon 35 library DNA was completely digested with restriction enzymes BamH I and Hind III, and DNA fragments at the length of 0.2-1.0 kb were recovered from agarose gel and cloned into pUC 18 plasmid. The 1376 white clones were randomly picked from X-gal plates. The 1075 clones (78 percent) containing single copy DNA sequence were selected after two-round hybridization with human total genomic DNA. This is a very efficient way to isolate single copy probes. These DNA probes will be used on the YAC screening and framework or STS mapping of human X chromosome.

Key words: Genome analysis, Human X chromosome, Single copy probe, YAC (yeast artificial chromosomes), STS (sequence tagged site)

Improved Sensitivity in Serodiagnosis of HCV Infection by Use of Branched Synthetic Peptide From Nucleocapsid Protein as Antigen

40091002B Beijing GAOJISHU TONGXUN [HIGH
TECHNOLOGY LETTERS] in Chinese
Vol 3 No 4, 1993 pp 6-8

[English abstract of article by Jin Dongyan [6855 0392 7159], Yan Ziyang [7346 1311 4481], Hou Yunde [0186 0061 1795], et al. of the Institute of Virology, Chinese Academy of Preventive Medicine, Beijing]

[Text] A branched biomacromolecule MAP-C-19, which contains eight copies of immunogenic peptide C-19 from the nucleocapsid protein of HCV, was directly synthesized on the eight-branch MAP resin with the Fast Moc

technique. As shown by reverse-phase HPLC and protein sequencing, the synthetic branched peptide was both pure and chemically defined. Indirect ELISA with the MAP-C-19 peptide as coating antigen was used to test 47 serum samples in addition to the quality-control panels for sera prepared by ourselves or supplied by the National Institute for the Control of Pharmaceutical and Biological Products. The detection sensitivity was found to be higher than unbranched C-19 peptide and up to the national standard.

Key words: Hepatitis C virus (HCV), Solid phase peptide synthesis (SPPS), Multiple antigenic peptide (MAP), ELISA

Construction of Recombinant Oral Vaccine Against *Salmonella typhi* and *Salmonella typhimurium*

40091002C Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 4, 1993 pp 9-12

[English abstract of article by Cao Yunxu [2580 7291 2485], Wen Zaorong [3306 5128 2837], and Lu Deru [7120 1795 1172] of the Institute of Medical Biotechnology and Molecular Genetics, Shanghai]

[Text] The *ViaB* genes fragment coding for the expression of Vi polysaccharide antigen for *Salmonella typhi* Ty2 was subcloned into the expressing vector pYA248. Then the recombinant plasmid SMM202 was transformed into *S. typhimurium* x4072, an attenuated Δ cya Δ crp mutant, to make it express Vi antigen steadily. The x4072 (SMM202) strain which expressed Vi antigen still had the ability to invade and colonize lymph nodes, liver and spleen of Balb/c mice through intestinal tract. Mice that had been orally immunized with living x4072 (SMM202) developed serum and secretory antibodies and DTH response to the Vi antigen, as measured by passive hemagglutination assay. Mice developed a delayed type hypersensitivity following a footpad injection with Vi antigen after being sensitized orally with a suitable dosage of x4072 (SMM202). Immunization of mice with x4072 (SMM202) yielded complete protection against infections with virulent *S. typhi* Ty2, and wild *salmonella typhimurium*.

Key words: Oral vaccine, Vi Polysaccharide, Attenuated *S. typhimurium*.

Study on the Specific Binding Site of NF-kB-Like Factor at the 5' Upstream Region of Human Lymphotoxin Gene

40091002D Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 4, 1993 pp 13-16

[English abstract of article by Xu Ren'er [1776 0086 1422] and Zhao Shouyuan [6392 1108 0337] of the Institute of Genetics, Fudan University, Shanghai]

[Text] Lymphotoxin (LT) is a glycoprotein secreted by activated T cell. The expression of LT gene is majorly controlled at the level of transcription. Results of gel retardation assay show that nuclear extracts from Jurkat cells treated with PMA and PHA form multiple complexes. Changes in complex distribution are observed at different time of PMA and PHA induction. A specific protein-binding site is mapped to a 22bp sequence at the 5' upstream region of human LT gene by DNase I footprinting analysis. This region is similar to the sequence recognized by the proteins of NF-kB family. The results of fragment competition and homology analysis indicate that the 22bp sequence contains a kB-like motif only, which is located at base pairs—100 to—90 (5'-GGGGGCTTCCC-3'). Thus the NF-kB-like factors are involved in the protein-DNA interaction. Furthermore, there are more than one retarded bands appearing in the gel retardation assay. It suggests that there may be various kinds of NF-kB-like factors involving in the regulation of LT gene transcription at the same site.

Key words: Human LT gene, Protein-DNA Interaction, Transcription Regulation

Cloning of cDNA for Human VEGF and Its High-Efficiency Expression in *E. coli*

40091002E Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 5, 1993 pp 13-16

[English abstract of article by Yang Yadong [2799 0068 2639], Yang Heping [2799 0735 1627], et al. of the Lab. of Molecular Biology, Cardiovascular Institute of Beijing Medical University, Beijing, and Li Daizong [2621 1486 1350] and Gu Jianren [7357 0256 0086] of the Shanghai Cancer Institute, Shanghai]

[Text] VEGF is a recently discovered growth factor specific to vascular endothelial cells. The cDNA for VEGF is isolated and cloned by PCR from human fetal liver, with sense primer 5'-GGG GGA TCC GCC TCC GAA ACC ATG AAC TT-3' and antisense primer 5'-CCC GAA TTC TCC TGG TGA GAG ATC TGG TT-3'. Sequencing analysis shows that the cloned segment is in accordance with VEGF₁₆₅ reported previously. High-efficiency expression of human VEGF in *E. coli* is achieved, with the expression products accounting for more than 30 percent of the total bacterial proteins. The employed expression system includes POP2136 strain of *E. coli* as engineering host and pKPL-3b as vector, which provides the P_L promoter and two SD sequences. The foreign VEGF cDNA segment is constructed into pKPL-3b between Nco I and EcoR I sites. The triplet ATG in the Nco I site plays the role of translation initiation codon with unchange of the open reading frame but loses the first two amino acids of the N-terminal of natural mature VEGF. This study provides an easy alternative way for large-scale preparation of VEGF.

Key words: Vascular endothelial growth factor (VEGF), PCR, *E. coli*, High-efficiency, Vascular Endothelial Cell

Gene Expression of Human-Mouse Chimeric Antibody Against Encephalitis Type B Virus

40091002F Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 5, 1993 pp 25-28

[English abstract of article by Huang Hualiang [7806 5478 2733], Lin Qing [2651 2532], et al. of the Institute of Genetics, Academia Sinica, Beijing and Chen Boquan [7115 0130 2938], Xiong Ximing [3574 2569 2494], and Wu Meiyang [0702 5019 5391] of the Institute of Virology, Chinese Academy of Preventive Medicine, Beijing]

[Text] The functional heavy chain- and light chain-variable region genes screened from gene library of hybridoma 51-8 secreting neutralization antibody against encephalitis type B virus were ligated with human constant-region genes of heavy chain and light chain respectively, and a human-mouse chimeric heavy chain gene and a chimeric light chain gene constructed. Two kinds of chimeric genes were used to co-transfect myeloma cell Sp2/0. The rate of transfection was 2.8×10^{-7} . Supernatants from transfectants were screened by means of reverse passive hemoagglutination inhibition assay (RPHI). As a result, there was one cell line, the RPHI titer, of which supernatant ($>1:32$) was much higher than that of original hybridoma 51-8 ($1:2$), and was nominated as LH2, which has been passed over 30 generations in vitro. The supernatant of LH2 was specifically led to react with goat anti-human IgG (Fc specific) antibody, which proved it was a chimeric antibody. With SDS-PAGE to analyze the supernatant of LH2, the bands of heavy chain and light chain were observed, in which molecular weights were 51kb and 19kb respectively. The results showed that the cell line LH2 was stably expressed human-mouse chimeric antibody against encephalitis type B virus.

Key words: Human-mouse chimeric antibody, Transfection, Expression of antibody gene, Encephalitis type B virus

Overexpression of Streptomyces Diastaticus No. 7 Strain M1033 Glucose Isomerase in E. Coli

40091002G Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 7, 1993 pp 9-12

[English abstract of article by Cui Hong [1508 5725], Liu Xian'an [0491 0752 1344], et al. of the Department of Biology, University of Science and Technology of China, Hefei]

[Text] Strain M1033, a gene that encodes thermostable glucose isomerase in Streptomyces diastaticus No. 7, was cloned into cloning vector pUC generate shuttle plasmid pUB. The structural glucose isomerase gene of pUB was further subcloned into expressed vector, which is able to overexpress glucose isomerase of strain M1033 in E. Coli. The pUB was digested by Dde I and Kpn I to obtain

structural glucose isomerase gene without its regulation sequence. Then the fragment was subcloned into expressed vector pT7-7 to construct expressed plasmid pTKD-Gi. The pTKD-Gi was introduced into E. Coli K38 which contains T7 polymerase gene. The glucose isomerase gene was overexpressed in E. Coli. The protein was 35 percent of total in soluble fraction. The solution was applied to a DEAE A-50 column, elution with a linear (0.25-0.5M) NaCl gradient and G-150 column washed with 0.15M NaCl in some buffer. 34 mg of pure glucose isomerase per liter culture, which has a band in SDS-PAGE (purity >95 percent), were obtained.

Key words: Streptomyces diastaticus No. 7 Strain M1033, Glucose Isomerase (Xylose Isomerase), Gene expression

Construction and Expression of Human TNF Derivative cDNA

40091002H Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 7, 1993 pp 13-16

[English abstract of article by Cai Wucheng [5591 2976 1004], He Xiaolong [0149 2556 7893], et al. of the Institute of Genetics, Fudan University, Shanghai]

[Text] Site-directed mutagenesis of recombinant human tumor necrosis factor (rhTNF) was induced by using polymerase chain reaction (PCR) technique. Nine rhTNF derivatives cDNA thus constructed were transformed and expressed in E. coli. The mutations introduced into rhTNF cDNA were deletion, addition and substitution of the codon. Among the nine derivatives cDNA, four were mutated at 5' terminus (corresponding to the N terminus of rhTNF), one mutated at 3' terminus (corresponding to the C terminus of rhTNF), and the rest mutated at the both 5' and 3' termini. All of the protein products expressed by the nine rhTNF derivatives cDNA were cytotoxic to L929 cells. The molecular weight of the SDS-PAGE bands produced by ultrasonic supernatant of the cell lysates demonstrated that the proteins were exactly the designed products. The yield and cyto-toxicity of some derivatives increased significantly as compared with rhTNF.

Key words: rhTNF derivative, Site-directed mutagenesis, PCR

Pilot Purification of Recombinant Proteins Expression in E. colias Inclusion Bodies

40091002I Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 9, 1993 pp 11-15

[English abstract of article by Xu Mingbo [1776 2494 3134], Dong Xiaojie [5516 2556 2638], et al. of the Institute of Basic Medical Sciences, Academy of Military Medical Sciences, Beijing]

[Text] This work focuses on the purification of interleukin-2, Interferon γ and GM-CSF, including inclusion body recovery, protein extraction, refolding, chromatographic purification and scaling up process. Because

these proteins share some common characteristics, good separation results are obtained in initial purification step with gel filtration chromatographic method. Further purification programme should be decided according to the extraction reagent used (such as urea, guanidinium chloride or SDS) and the molecular characteristics of the product. In the case of IL-2, reverse-phased chromatographic separation is used to remove the unfolded or mismatched disulfide molecules. The final product presents a homogeneous tertiary structure, with specific activity higher than 1.7×10^7 U/mg, indicating the purification process is of high efficiency.

Key words: Recombinant Protein, Inclusion body, Purification, Pilot

Two Years Observation of Immunologic Effect of a Hepatitis A-Vaccinia Recombinant Virus (VMS11HAV25)

40091002J Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 9, 1993 pp 16-19

[English abstract of article by Guo Kejian [6753 0668 6190], Wang Quanying [3769 0356 4481], et al. of the Institute of Virology, Chinese Academy of Preventive Medicine, Beijing]

[Text] Eight children of 6-8 yrs old, who had never been immunized with vaccinia and were sero-negative to HAV, had a primary reaction of vaccinia after vaccination with a hepatitis A-vaccinia recombinant virus (VMS11HAV25). All the eight children showed sero-conversion to both HAV and vaccinia virus. The HAV antibody titers were $1:4 \geq 1:16$ two months after vaccination in ELISA competition test and $1:10-1:80$ in neutralization test. HAV antibody remained positive 2

years after vaccination. None of them contracted hepatitis A during the observation period. Whilst among 8 nonvaccinated control children one contracted hepatitis A with detected HAV-IgM and another one caught an asymptomatic infection.

Key words: Hepatitis A, Recombinant vaccinia virus, Vaccine, Immunogenicity.

Expression of Isopentenyl Transferase (ipt) Gene Regulated by Different Promoter in Nicotiana Tabacum

40091002K Beijing GAOJISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 9, 1993 pp 27-30

[English abstract of article by Ma Mi, Zhou Dafeng, Qian Zhongxing, and Lin Zhongping of the Institute of Botany, Academia Sinica, Beijing]

[Text] Agrobacterium tumefaciens cytokinin biosynthetic genes coding for enzyme isopentenyl transferase (ipt) were respectively fused with CaMV 35S, rbcS and ipt native promoters and were transferred into Nicotiana glauca (W38) via agrobacterium mediated procedure. The transformed plants with the transgenes of CaMV 35S P-ipt, rbcS p-ipt and ipt p-ipt were obtained and were identified by Southern hybridization and PCR DNA amplification of ipt coding sequence from total DNA of transformed tobacco. The aminoglycoside phosphotransferase, which is due to selectable marker NPT II gene, was detected by chromatogram and autoradiogram method. A series of morphological changes, such as promotion of axillary bud growth, inhibition of root growth, shortened internode and delay of leaf senescence, were observed.

Key words: Isopentenyl transferase (ipt) gene, Transgenic tobacco

AST, Tianjin Firm Establish Joint Venture

94P60016A Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 35, 15 Sep 93 p 1

[Article by Shen Yao [3947 3852] and Liu Jiuru [0491 0046 1172]: "AST China Headquarters Established by Formal Agreement"]

[Summary] On 9 September at the Diayutai State Guest House in Beijing, representatives of the U.S. firm AST and of the Tianjin Economic and Technological Development Zone's Kangda [1660 6671] Enterprises formally established a joint venture (JV) to be called AST China Headquarters. This US\$16 million JV will be completed and in operation in 1994. AST China Headquarters will build a new AST manufacturing plant, which when completed will be capable of annual production of 185,000 AST microcomputers, 380,000 CPU boards, and other parts. Seventy percent of the products will be exported for the global market.

Stone Group, Lotus To Cooperate on Software Development

94P60016B Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 37, 29 Sep 93 p 1

[Article by Xiao Yan [2556 3601] and Liu Jiuru [0491 0046 1172]: "Stone, Lotus Cooperate on Software Development"]

[Summary] On 22 September in Beijing, representatives of the largest domestic civilian-run high-tech firm, the Stone Group, and of Lotus [Development Corp.], the world's second largest PC software developer, signed a letter of intent on software product cooperative development and sales. This agreement specifies the two firms' joint development of a Chinese-language Sinicized version of AmiPro software, as well as Stone's role as a sales agent for a series of Lotus applications software and as exclusive sales agent for the electronic spreadsheet software Lotus Improv.

Henan Province Public Packet Switching Network Completed

94P60016C Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 37, 29 Sep 93 p 1

[Article by Li Hongze [2621 1347 3419]: "Henan Completes Public Packet Switching Network"]

[Summary] The Henan Province Public Packet Switching Network jointly built by MPT's Institute of Data Communications Technology and the Henan Province P&T Management Office passed acceptance check on 6 September in Zhengzhou, and is formally in operation. This data network consists of 16 small packet switchers (type NP-168), five SPADs [switchable packet assembler/disassemblers], and 17 network management and control centers (NMCs), as well as various management terminals and transmission equipment. The entire network has 504 ports.

Stealthy Antenna With Frequency-Selective Reflector

94P60019D Beijing DIANZI KEXUE XUEKAN
[JOURNAL OF ELECTRONICS] in Chinese
Vol 15 No 5, Sep 93 pp 506-511

[Article by Feng Lin [7458 2651], Ruan Yingzheng [7086 4481 6927], and Lei Ping [7191 1627] of Department 2, University of Electronic Science and Technology of China (UESTC), Chengdu 610054: "Technology for Low-RCS Antenna With Frequency-Selective-Filter Reflector," supported by grants from MEI's Institute of Electronic Science and the Nanchang Aircraft Manufacturing Co.; MS received 6 Apr 92, revised 17 Aug 92]

[Abstract] A two-coordinate monopulse Cassegrain antenna with a periodic-structure frequency-selective surface (FSS) reflector is introduced. The antenna's radiation characteristics and radar cross section (RCS) are theoretically modeled and experimentally measured. Compared to an antenna with an ordinary metallic reflector, this FSS-reflector antenna has a similar radiation pattern and provides about 15 dB of RCS reduction.

Figure 1 below is a schematic of a planar filter reflector and its equivalent circuit, with dielectric intrinsic impedance $Z = Z_0/(\sqrt{\epsilon_r})$ (where ϵ_r is the relative dielectric constant of the base), base thickness d , and FSS equivalent impedance X . Figure 2 below shows the theoretically calculated reflection coefficient (in dB) of a FSS consisting of a periodic array of cross-shaped resonators at various frequencies for the following parameters: resonator period $S = 15.5$ mm, resonator length $l = 9.5$ mm, resonator width $w = 1.3$ mm, and resonator thickness $t = 0.6$ mm. Figure 3 below shows a model of the Cassegrain antenna, whose rotating-parabolic surface main reflector has an aperture of 270 mm and a focal length of 84 mm; the antenna also has a 70-mm-aperture shaped-beam subreflector feeding through a dielectric guide to a multimode horn and then to a sum-difference network. Optimized theory requires that the cross-shaped resonators in the FSS should be arrayed at an oblique angle $\theta = 45^\circ$, with parameters (as indicated in Figure 3) $S = 10$ mm, $l = 9$ mm, $w = 0.5$ mm, $t = 0.5$ mm, $\epsilon_r = 2.3$, and $d = 20$ mm.

The antenna model's reflection characteristics and RCS have been measured in a standard antenna test range and standard darkroom RCS test range, respectively. Figures 4 and 5 below show the measured antenna directional plots for the FSS-reflector antenna and an ordinary metallic-reflector antenna, respectively, at a frequency of 15.2 GHz with horizontal polarization. Table 1 lists the main parameters used in the testing. It can be seen that the radiation characteristics of the two antennas are quite similar. Figures 6 and 7 below show test results for the antenna model's RCS reduction, with horizontal polarization and vertical polarization, respectively, at an X-band frequency. As can be seen from these figures, the stealthy FSS-reflector antenna has maximum RCS

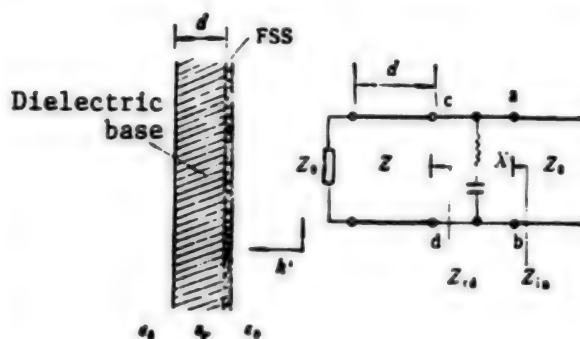


Figure 1. Planar Filter-Reflector, Its Equivalent Circuit

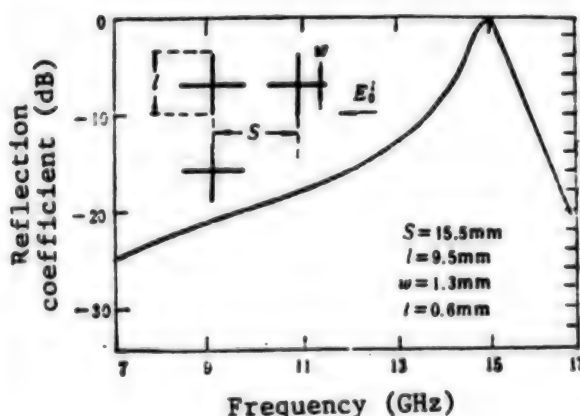


Figure 2. FSS Reflection Coefficient

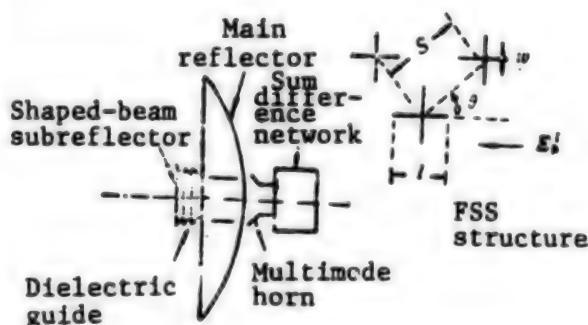


Figure 3. Filter-Reflector Antenna Model

values of -7 dBsm [decibels referenced to a square meter] and -9 dBsm for horizontal and vertical polarization, respectively, compared to maximum values of +9 dBsm and 0 dBsm for the metallic reflector; and within the entire range, this new stealthy antenna provides an average of about 15 dB RCS reduction in X band.

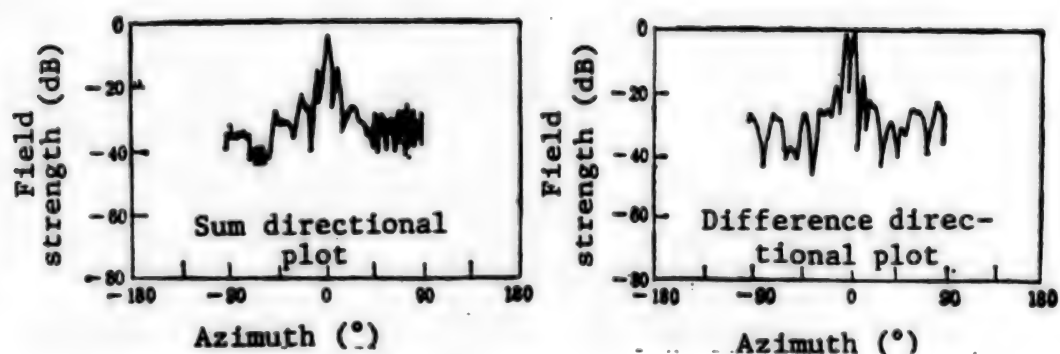


Figure 4. Directional Plots for Filter-Reflector Antenna

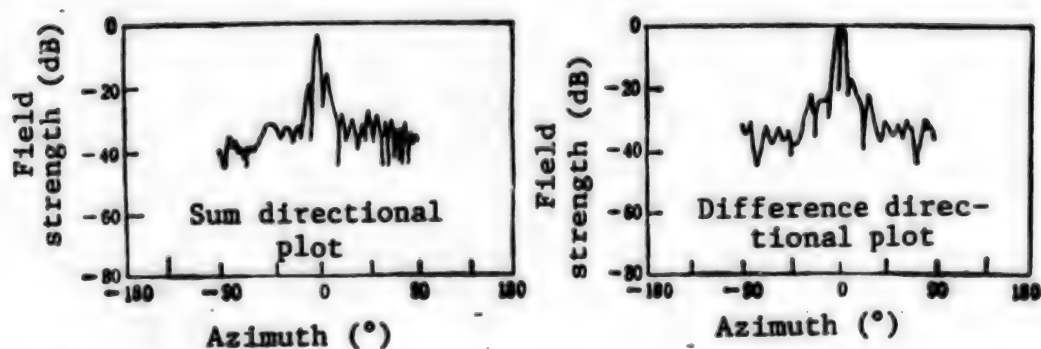


Figure 5. Directional Plots for Metallic-Reflector Antenna

Table 1. Antenna Model Directional Plot Parameters

Model type	Sum directional plot			Difference directional plot	
	Relative gain (dB)	3 dB main lobe width (°)	Auxiliary lobe level (dB)	Zero-point depth (dB)	Separation angle (°)
Filter-reflector	-0.4	5.31	-11.0	18.7	8.01
Metallic-reflector	0	4.89	-12.5	18.0	7.0

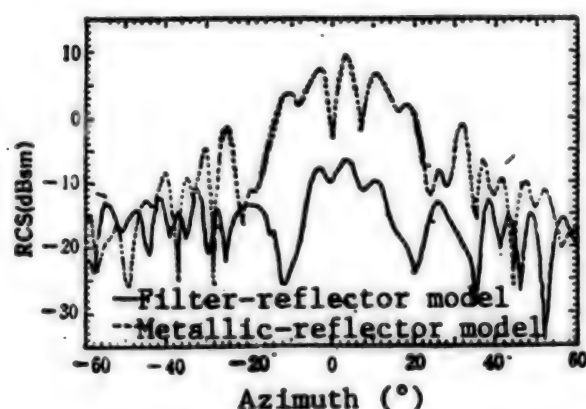


Figure 6. RCS of Antenna Model
(Horiz. polarization)

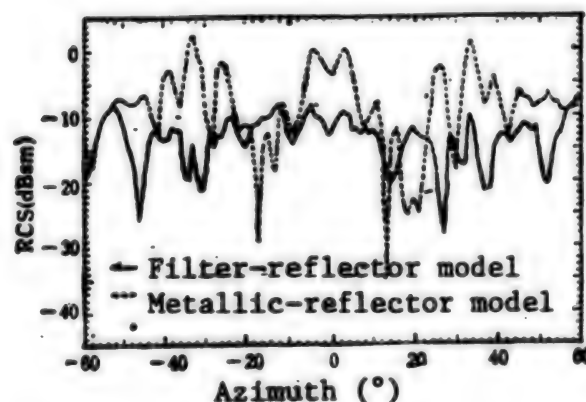


Figure 7. RCS of Antenna Model
(Vert. polarization)

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Development of Fast Two-Dimensional High-Resolution Direction-Finding Techniques

40100011A Beijing DIANZI KEXUE XUEKAN [JOURNAL OF ELECTRONICS] in Chinese Vol 15 No 5, Sep 93 pp 458-465

[English abstract of article by Wu Renbiao of the Key Laboratory for Radar Signal Processing, Xidian University, Xi'an 710071; MS received 24 Jan 91, revised 9 Sep 92]

[Text] A fast separable approach based on a cross array which has coarse-grained parallelism is presented. Its computational load is far less than that of the two-dimensional direct processing method and other existing separable approaches. In order to compensate for the performance degradation due to separable processing, two postprocessing schemes are also proposed. Some computer simulation results are provided for illustration at the end.

Study of Beam Transmission Properties of Radome Using Complex Ray Theory

40100011B Beijing DIANZI KEXUE XUEKAN [JOURNAL OF ELECTRONICS] in Chinese Vol 15 No 5, Sep 93 pp 556-560

[English abstract of article by Wang Guangming, Deng Fasheng, and Wang Jiqin of the Air Force Missile Institute, Shaanxi, Sanyuan 713800; MS received 3 Jan 92, revised 18 May 92]

[Text] Complex ray theory for three-dimensional space is researched, from which the method of complex ray tracing for arbitrary configuration in three-dimensional space is derived, and the beam transmission properties of a rotating parabolic radome are solved. According to the data calculated, the patterns of the beam transmitted through a rotating parabolic radome are plotted. Then they are compared with the patterns without radome and the effects of radome on the beam transmission are depicted.

Simplified Auxiliary Channel Approach to Clutter Suppression for Phased Array AEW Radars

94P60019C Beijing DIANZI KEXUE XUEKAN [JOURNAL OF ELECTRONICS] in Chinese
Vol 15 No 5, Sep 93 pp 475-481

[Article by Liao Guisheng [1675 2710 3932], Bao Zheng [0202 6927], and Zhang Yuhong [1728 3768 3163] of the Institute of Electronic Engineering, Xidian University, Xian 710071: "Simplified Auxiliary Channel Approach to Clutter Suppression for Phased Array AEW Radars"; MS received 13 Apr 92, revised 23 Oct 92]

[Abstract] A simplified four-auxiliary-channel approach which presents no difficulties in realizing ultra-low side-lobes for a Doppler filter in a moving-target-indication (MTI) phased array airborne early warning (AEW) radar is described. The new method has a performance the same as that of Klemm's method but requires much less computation.

The new approach, compared to traditional signal processing techniques involving phased array radar digital beamforming and two-dimensional space-time joint adaptive filtering,¹⁻⁴ does not require computation-intensive operations such as inversion of matrices of order $N + K - 1$ (where N is the number of antenna array elements and K is the number of coherent pile-up pulses). A computer simulation of the new approach was done with the following parameters: $N = 32$, $K = 34$, unit-element input clutter-to-noise ratio = 60 dB, Doppler filter with -70 dB weighting, transmitting antenna unweighted, receiving antenna with -20 dB weighting in high-low direction, azimuth direction adaptive, static weighting -40 dB, and antenna cone angle direction = 90°. Results of the simulation indicate that the noise improvement factor I_{\max} after two-dimensional phase-cancellation processing compared to that with conventional methods is much higher, reaching a limit of about 87 dB.

Eight figures (not reproduced) show various plots of conventionally processed data and data processed with the new approach. There are no tables.

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Gain, Breakdown Threshold of Domestic Ti:Sapphire Laser Crystal Are State-of-the-Art

Main Points

94P60019A Beijing GUANGMING RIBAO in Chinese
11 Sep 93 p 2

[Article by Chi Suyin [6688 4790 7299]: "Nation's Research on Titanium-Gem Laser Crystals Is State-of-the-Art"]

[Summary] Shanghai, 9 Sep (GUANGMING RIBAO wire report)—The Shanghai Institute of Optics and Fine Mechanics (SIOFM) research team led by Deng Peizhen [6772 0160 3791] has developed a new technique for fabricating high-quality Ti:sapphire laser crystal—a key component in tabletop high power (terawatt-class) ultra-short-pulse tunable laser systems. This new technique for producing high-temperature refractory oxide crystal and developing highly Ti-doped sapphire laser crystal with an increased Ti concentration and quality factor has yielded performance parameters—gain coefficient and laser breakdown threshold—that exceed the [previous] world state-of-the-art. Scientists at both Tokyo University's Institute of Physics and Lawrence Livermore Laboratory in the United States have begun to use this new SIOFM-developed Ti:gem laser crystal in their ultra-short-pulse terawatt-class high power laser systems, and a number of foreign commercial firms are placing orders for the crystal.

Specifications

94p60025A Shanghai WEN HUI BAO in Chinese
7 Oct 93 p 1

[Article by Huang Xin [7806 6580]: "Breakthrough in Nation's Research on Laser Crystal Materials"]

[Summary] With their high-quality Ti:sapphire laser crystal, Deng Peizhen's research group this year achieved a picosecond-class laser pulse single-pass gain of 45 dB (35,000 times), a double-pass gain of 62 dB (1.5 million times), and a laser breakdown threshold exceeding 15 J/cm². These values are all in the lead worldwide.

CW Output Power of 155 mW Obtained With 980-nm Ti:Sapphire Tunable Laser

94P60027C Beijing ZHONGGUO KEXUE BAO [CHINESE SCIENCE NEWS] in Chinese
22 Sep 93 p 2

[Article by Xie Jianping [6200 1696 1627] and Peng Dejian [1756 1795 1696]: "Breakthrough in Research on Ti-Gem Tunable Lasers"]

[Summary] Researchers at the University of Science and Technology of China (USTC) recently had a major breakthrough in research on long-wavelength Ti:sapphire tunable lasers, whose 980-nm-wavelength light is an excellent pump source for basic research on erbium-doped fiber amplifiers (EDFAs). The USTC researchers

used a Czochralski-grown crystal (supplied by the CAS Anhui Institute of Optics and Fine Mechanics) whose two ends form an 11.5-mm-long Brewster window pumped by an Ar-ion laser. At a pump power of 10.5 W, the USTC scientists achieved a CW output power of 155 mW with its Ti:sapphire tunable laser at the 980-nm wavelength; slope efficiency is 3.7 percent.

Domestic LCD Technology Advances: Report on Sino-Japanese Conference

94P60027A Beijing ZHONGGUO DIANZI BAO [CHINA ELECTRONICS NEWS] in Chinese
22 Sep 93 p 1

[Article by Cui Yachao [1508 0068 6389]: "Nation's Liquid Crystal Display Technology Strides Into World's Front Ranks"]

[Summary] This writer learned at the Sino-Japanese Liquid Crystal Display (LCD) Conference held in Changchun 6-9 September that China's LCD R&D—including liquid crystal physics, electronics, and device fabrication technology—have entered the world's front ranks. The domestic LCD industry, based on over 30 imported LCD production lines, now exports 80 percent of its products, earning tens of millions of dollars in foreign exchange annually, and capturing a good part of the world market. The leading domestic units engaged in LCD R&D include the CAS Changchun Institute of Physics, MEI's Institute 55, Qinghua University, Nankai University, the CAS Shanghai Institute of Organic Chemistry, the Changchun Institute of Applied Chemistry, and the Shenzhen Tianma Microelectronics Company. Based on market demand, the CAS Changchun Institute of Physics has developed design/production/testing technology for a state-of-the-art 4-inch STN [supertwist-nematic] liquid crystal matrix display.

JHW-I Concealed Laser IR Night Vision System Described

94P60027B Beijing ZHONGGUO KEXUE BAO [CHINESE SCIENCE NEWS] in Chinese
22 Sep 93 p 2

[Article by Liu Li [0491 0500]: "Concealed Laser Night Vision System Can Clearly See Almost Indiscernible Objects in the Dark"]

[Summary] It has been learned from the First China S&T International Fair that the JHW-I concealed laser active infrared night vision system developed by researchers at the CAS Institute of Semiconductors has impressed fair attendees with its unique red-glare-reduction technology. This night vision system, based on the institute's own semiconductor laser and optoelectronics technologies, consists of a high-performance semiconductor laser source, an IR camera, a control apparatus, and B&W monitoring equipment; it can be used in totally dark

environments to pick up objects otherwise almost indiscernible and can be remote controlled.

Optical Implementation of Inverse Perfect Shuffle Interconnection Network

94P60019B Beijing GAO JISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 8, aug 93 pp 8-11

[Article by Li Hongpu [2621 3163 6225], Cao Mingcui [2580 2494 5050], et al. of the National Laboratory of Laser Technology, Huazhong (Central China) University of Science and Technology, Wuhan 430074: "Optical Implementation of Inverse Perfect Shuffle Interconnection Network," supported by grants from 863 Plan and NDSTIC; MS received 9 Jun 93. Cf. JPRS-CST-93-010, 27 May 93 pp 19-22]

[Abstract] A new free-space optical interconnection network—the inverse perfect shuffle (IPS) network—for digital optical computing is proposed and some properties of this network are presented. It is experimentally demonstrated that the optical IPS can be implemented with a polarizing combination prism and a chiral nematic liquid-crystal spatial light modulator

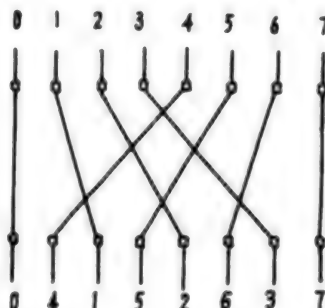


Figure 1. Schematic of 8-Bit PS Interconnection

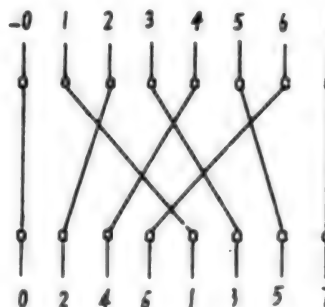


Figure 2. Schematic of 8-Bit IPS Interconnection

(SLM). The apparatus is characterized by simple architecture, ease of integration, and equal path length for all optical channels.

An 8-bit IPS optical interconnection is illustrated schematically in Figure 2 below, while Figure 1 shows the traditional perfect shuffle (PS) interconnection; inputs are at the top and outputs are at the bottom in both figures. The implemented apparatus—consisting of a nematic liquid-crystal SLM, a 45° rectangular prism, a block polarizing prism, and an optical path compensation plate—is shown in Figure 3 below, while Figure 4 (photograph not reproduced) shows an 8 x 2-element input array (top line: eight light spots; bottom line: letters A-H, from left to right) and its corresponding IPS 8 x 2-element output array (top line: eight light spots; bottom line: letters A,C,E,G,B,D,F, and H, from left to right). An Ar-ion laser is used as the light source. There are no tables.

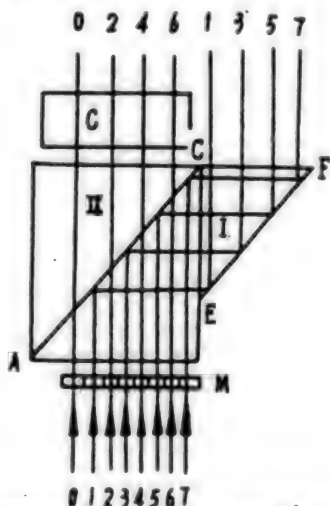


Figure 3. Schematic of Optical Apparatus for Implementing IPS; I = 45° rectangular prism, II = cubic polarizing prism, C = optical-path compensation plate, M = nematic liquid crystal SLM, diagonal line AC indicates interface coated with fixed-wavelength 45° polarizing film, diagonal line EF indicates surface coated with 45° total-reflection film. Inputs 0-7 are at bottom, outputs are at top.

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Optoelectronic Butterfly Interconnection Implementation of Parallel Digital Calculation

40100012A Beijing JISUANJI YANJIU YU FAZHAN [COMPUTER RESEARCH AND DEVELOPMENT] in Chinese Vol 30 No 8, Aug 93 pp 61-65

[English abstract of article by Wang Naxin, Sun Degui, and Weng Zhaozheng of State Key Laboratory of Applied Optics, Changchun Institute of Optics and Fine Mechanics, CAS, Changchun, 130022, and He Liming of Department of Electronic Engineering, Jilin University of Technology, Changchun, 130022 and State Key Laboratory of Applied Optics, Changchun Institute of Optics and Fine Mechanics, CAS, Changchun, 130022; MS received Dec 92]

[Text] An optoelectronic butterfly interconnection network for implementing parallel digital calculation is presented. Using this network with MSD [modified signal digit] algorithm which is well known for parallel computing, we can perform parallel addition, subtraction, and high-speed multiplication and division. The advantages of using this architecture for optical computing lie in its full exploitation of the parallelism, lack of crosstalk in optical interconnection, the convenience of electrical interconnection over a short distance, and thus significant increase in speed compared with its existing counterpart.

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Nation's First Utilitarian 1.5-2-Micron Step-and-Repeat Projection Photolithography Machine Developed

94P60028C Beijing KEJI RIBAO [SCIENCE AND TECHNOLOGY DAILY] in Chinese 15 Oct 93 p 1

[Article by Li Jing [2621 0352]: "China Develops First Utilitarian 1.5-2-Micron Step-and-Repeat Projection Photolithography Machine"]

[Summary] The nation's first utilitarian 1.5-2-micron direct step-and-repeat projection photolithography machine, developed by the CAS Institute of Optoelectronic Technology, has been used in a domestic production line to fabricate 2-micron CMOS 2000-gate array circuits. This mid-eighties-level IC fabrication equipment—manufactured by the United States, Japan, the Netherlands and a few other nations and strictly export-controlled to China—will provide a major boost to domestic IC research and production in the Eighth FYP. The new machine was tested for 4 months at the Beijing Microelectronics Center, where four trial batches of 2-micron silicon-gate CMOS 2000-gate array chips evidenced a yield exceeding 50 percent. In operation for a total of 1,000 hours during which no faults occurred, this new photolithography unit exhibited main technical performance indicators that meet or exceed those of the GCA6700C machine made in the United States. On 14 October, the new machine passed the CAS-level appraisal given by a panel of three semiconductor experts.

High-Electron-Mobility GaAs/AlGaAs 2DEG Material Developed

94P60028A Beijing ZHONGGUO KEXUE BAO [CHINESE SCIENCE NEWS] in Chinese 27 Sep 93 p 1

[Article by Liu Li [0491 0500]: "High-Mobility New Material Developed"]

[Summary] Researchers at the CAS Institute of Semiconductors as an 863 Plan project have developed an MBE-grown ultra-thin-layer material described as a GaAs/AlGaAs two-dimensional electron gas (2DEG) structural material with a low-temperature (4.8K) electron mobility exceeding the 1 million level—an achievement indicating the nation's MBE technology now meets advanced international standards. This material, important both to basic physics and to new device development, has specific applications in radar, electronic countermeasures, fiber optic communications, digital microwave communications, and high-accuracy/high-speed instruments and meters. The modulation-doped GaAs/AlGaAs material's electron mobility measures $1.14 \times 10^6 \text{ cm}^2/\text{V-s}$ at 4.8K (dark field) and $1.97 \times 10^5 \text{ cm}^2/\text{V-s}$ at 77K.

High Frequency Performance Si/SiGe/Si HBT Developed

94P60028B Beijing ZHONGGUO DIANZI BAO [CHINA ELECTRONICS NEWS] in Chinese 27 Sep 93 p 3

[Article by Jin Xiaotao [6855 1420 2711] and Shu Jianhua [5289 1696 5478]: "China Develops Silicon-Germanium Heterojunction Transistor With High Frequency Performance"]

[Summary] Huajing Electronics Group's Central Research Institute and Fudan University's Surface Physics Research Section have jointly developed a Si/SiGe/Si heterojunction bipolar transistor (HBT) with high frequency performance. In the 800-1,000 Hz frequency range, this device has a maximum power gain of 6 dB. The HBT's cutoff frequency is 1.6 kHz.

Report on HDTV-93 Beijing International Conference

94P60026A Beijing ZHONGGUO DIANZI BAO
[CHINA ELECTRONICS NEWS] in Chinese
17 Sep 93 p 1

[Article by Liu Dong [0491 2639]: "High Definition Television Development Planning Underway"]

[Summary] At the HDTV-93 Beijing International Conference held 8-12 September, this writer learned that the Ministry of Electronics Industry (MEI) has formulated its initial plans for domestic development of high definition television (HDTV). At the conference, attended by representatives from China, Japan, Korea, Hong Kong, and Taiwan, SSTC Vice Minister Hui Yongzheng announced that the near-term goals for the nation's development of HDTV—as guided by state investment—are the construction by 2000 of an HDTV trial-broadcast station as a pilot project, and concomitantly the activation and development of an HDTV market. Via research in the technical processes of this station, engineers will develop expertise in the key technologies and manufacturing techniques associated with an HDTV industry; this in turn will spur development of large-scale HDTV production technology.

Other MEI officials updated conference attendees on MEI's "Rainbow Plan" for domestic development of a series of HDTV equipment, especially the establishment of small expert groups and work teams. It was announced that MEI's initial plans specify an overall domestic standard and cover such R&D areas as high-resolution display tubes, CRT projection tubes, HDTV non-broadcast applications systems, codec [i.e., coding/decoding] technology and equipment, and HDTV monitors. It was also learned that domestic universities, research institutes, and commercial firms are now engaged in key R&D projects in HDTV hardware and software technologies and product development covering the entire range from transmission to high-quality reception.

Latest Reports on Fiber Optic Communications**Rapid Growth in Shanghai Industry**

94P60023A Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 9 Oct 93 p 2

[Article by Feng Yizhen [7458 3791]: "Shanghai Accelerates Development of Fiber Optic Communications Industry"]

[Summary] Shanghai (XINHUA)—The Shanghai fiber optic communications industry is experiencing rapid growth, with products and technologies that meet or approach the international state-of-the-art. Shanghai-made fiber optic cable, optical devices, optoelectronic terminals and similar products account for an output value that is expected to exceed 1 billion yuan this year. Over the next 3 years, the Shanghai Municipal Fiber

Optic Communications Engineering Company has contracted for almost 500 projects—with total investment of almost 900 million yuan—involving digital communications systems, dedicated network systems, and cable TV network systems. International joint ventures (JVs) are growing too, with the establishment since 1991 of three Sino-U.S. JVs—involving AT&T and Scientific-Atlanta—for the production of fiber optic digital communications equipment, fiber, cable, and optoelectronic cable TV systems, which together should account for an output value of 700 million yuan this year. The Sino-U.S. JV AT&T Communications Equipment Ltd. has already supplied over 20 provinces and municipalities with state-of-the-art optoelectronic terminals, capturing over 30 percent of the domestic market, and since 1992 has shipped part of its output overseas. The Shanghai Cable Plant's imported fiber-optic-cable manufacturing line now accounts for annual output and sales of over 1,000 km of cable.

Three Trunkline Cables Operational

94P60023B Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 16 Oct 93 p 1

[Article by Wang Yanrong [3769 1693 2837] and Liu Manjun [0491 2581 6511]: "Nation's Fiber-Optic-Cable Communications' 'Main Pulse' Operational"]

[Summary] Beijing, 15 Oct (XINHUA)—The national fiber optic communications network's "main pulse" trunklines—the Beijing-Wuhan-Guangzhou, Guangzhou-Nanning, and Guangzhou-Hainan fiber optic cables—are now completed, with formal operation beginning today. This 4,700-km-long trunkline network, the world's longest fiber-optic-cable trunkline, can provide 105,000 long-distance telephone circuits and was built with a gross investment of over 500 million yuan. The main segment, the 3,074-km-long Beijing-Shijiazhuang-Zhengzhou-Wuhan-Changsha-Guangzhou trunkline, is the nation's first independently developed and built all-domestically-made level-one fiber optic cable trunkline, uses DS4 [i.e., 140 Mbit/s] transmission systems, and provides 98,000 long-distance telephone circuits. The Guangzhou-Nanning and Guangzhou-Hainan trunkline extensions are 804 and 858 km long, respectively, and provide 12,240 and 18,840 new long-distance telephone circuits, respectively. During the Eighth FYP, China will complete 22 fiber-optic-cable trunklines, totaling 32,000 km, that will form an "information highway."

Pigtailed F-P Tunable Filter Used in 4 x 622 Mb/s DWDM Optical Transmission System

40100010A Beijing GAO JISHU TONGXUN [HIGH TECHNOLOGY LETTERS] in Chinese
Vol 3 No 8, Aug 93 pp 4-7

[English abstract of article by Liu Fenghai, Xie Shizhong, and Zhou Bingkun of the Dept. of Electronic Engineering, Qinghua University, Beijing 100084; MS received 18 Jun 93, revised 5 Jul 93]

[Text] A pigtailed F-P [Fabry-Perot] tunable filter used as demultiplexer in a 4-channel 622 Mb/s DWDM [dense wavelength division multiplexing] optical transmission system is presented. The filter has free spectrum range (FSR) of 10 nm and fineness of 35. It is single-mode fiber coupled. The measured insertion loss is 4.7 dB. Adjacent channel interference (ACI) is less than 20 dB. A frequency locking controller is also presented. By using the controller, output fluctuations due to thermal, mechanical, or any other parameter variations in F-P filter are sensed and eliminated. This makes the F-P filters have excellent long-term thermal stability.

Recent Developments in Satellite Communications

Shanghai Domestic Earth Station Network Tests Completed

94P60017A Shanghai WEN HUI BAO in Chinese
29 Sep 93 p 3

[Article by Zheng Wei [6774 5588]: "Shanghai Domestic Satellite Earth Station Passes Network-Entry Tests"]

[Summary] The Shanghai Qibao [0003 1405] Domestic Satellite Earth Station formally passed Intelset and domestic network-entry verification and testing yesterday, and has been formally approved for network operations by the China Satellite Communications Corporation. This station, built to ease congestion between the eastern Seaboard and remote regions, is one of 18 new domestic satellite earth stations being built in the near future. Built with the help of a Canadian government loan, this 57-million-yuan station has equipment imported from Canada's Spar Aerospace Ltd., including four antennas, two of which (one 16-meter and one 13-meter) have been completed. The Shanghai station is the largest in East China, and will soon formally open up 1074 satellite circuits in 13 directions: Beijing, Hohhot, Shenyang, Harbin, Guangzhou, Haikou, Chengdu, Chongqing, Xian, Urumqi, Qingdao, Xiamen, and Lhasa. Also, by the end of next year the station will open up an additional 300 circuits in five directions: Wuhan, Fuzhou, Kunming, Lanzhou, and Nanning.

Fourth Shanghai Intelsat Earth Station Being Built

94P60017B Shanghai WEN HUI BAO in Chinese
5 Oct 93 p 1

[Article by Zheng Wei [6774 5588]: "Shanghai Building Fourth International Satellite Earth Station"]

[Summary] A class-A international satellite earth station in Shanghai—the municipality's fourth Intelsat earth station—is now being built. The three earlier satellite earth stations are the Pacific Ocean station, the Indian Ocean station, and the Intelsat Business Services (IBS) station. The 43-million-yuan fourth station will have a first-phase capacity of 1000 international satellite circuits. In spring of 1994, a 20-meter-diameter Cassegrain

antenna will be set up at the class-A station, and network-entry operations are to begin in the second quarter of 1994.

Offshore Oil Industry Satcom Network Completed

94P60017C Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 14 Oct 93 p 1

[Article by Gao Xinghua [7559 5281 5478]: "Offshore Oil Industry Satellite Communications Network Completed"]

[Summary] Beijing, 13 Oct (XINHUA)—The offshore oil industry dedicated satellite communications network approved by the State Radio Regulatory Committee was completed a few days ago and is now in trial operation. This satcom network now includes six on-shore base stations and three offshore-oil-field platform stations. This dedicated network has one network management and control center (NMC) located in Tanggu, Tianjin Municipality, while a second NMC is located in Shenzhen's Shekou district: the two NMCs act as back-ups for each other. Satellite earth station equipment for the network was imported from the U.S. firm Hughes Corp. by the China National Offshore Oil Corporation.

Canadian Telecom Giant Flexes Muscles

40100009A Beijing CHINA DAILY (BUSINESS
WEEKLY) in English 18 Oct 93 p 2

[Article by Xie Liangjun]

[Text] In an aggressive business expansion, Canada's Northern Telecom has set up a new business unit called Nortel China, following in the footsteps of its rival AT&T.

Based in Beijing, Nortel China will be responsible for NT operations in the mainland, Taiwan and Hong Kong. The new company will be involved in research, development, production, sales and servicing of telecommunications products.

"The creation of Nortel China acknowledges the importance we attach to China and marks a significant new era in our relationship with China," NT president Jean Monty said in Beijing. He admitted that NT considers China its "single most important international market."

AT&T of the United States announced four months ago the creation of AT&T China Business Unit, also based in Beijing, in hopes of reinforcing its strong presence in China. A major role of this unit will be to implement a memorandum of understanding reached between AT&T and the State Planning Commission in February, 1993, in which the two sides pledged closer telecommunications co-operations.

China is becoming an increasingly important market for Northern Telecom, one of the world's leading manufacturers of digital telecommunications equipment.

At a Beijing news conference last week, NT announced several big deals signed in past four months with China to sell DMS switching systems worth a total of \$314 million to telecom authorities in Henan, Jiangxi, Shaanxi, Yunnan, Hebei, Jilin provinces and the cities of Beijing and Chongqing.

Monty told the news conference that his corporation plans to set up a joint venture to manufacture programme-controlled telephone exchanges in Shunde in southern China's Guangdong Province and a research center in the Chinese capital.

Negotiations are under way, and Monty said that when these negotiations are concluded, this joint venture will include one of the largest research and development facilities in the world. He said NT hopes to launch it in early 1994.

The NT president also announced the setting up of two joint ventures in Shanghai to design and manufacture very-large-scale integrated (VLSI) circuits, which are at the core of advanced telecommunications systems. Their total investment will be \$100 million.

Currently, Northern Telecom has two joint ventures in operation in China.

NT and China Tong Guang Electronics Company launched Tong Guang-Nortel in 1988 in Shenzhen to manufacture Meridian ISDN digital switching systems.

Another joint venture, the Nortel-Posts and Telecommunications Technical Corporation, provides installation, training and technical support services to China-based users of its DMS devices. This joint venture is co-owned by NT and China International Telecommunications Construction Corporation and Xi'an Institute of Posts and Telecommunications.

The NT president said that since the beginning of this year, Northern Telecom has obtained orders of telecom equipment and switching systems worth \$400 million, double the level last year.

Monty said Northern Telecom has committed itself to transfer of advanced telecom technology, equipment and expertise to China, adding that it is pressing the appropriate Western governments, including those in Canada and the United States, to relax restrictions on technology transfer to China.

In June of this year, the State Planning Commission and Northern Telecom signed a memorandum of understanding in Toronto in which the Canadian telecoms giant agreed to invest in new manufacturing, research and development, technology transfer and training projects in coming years in China.

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